Fig.1

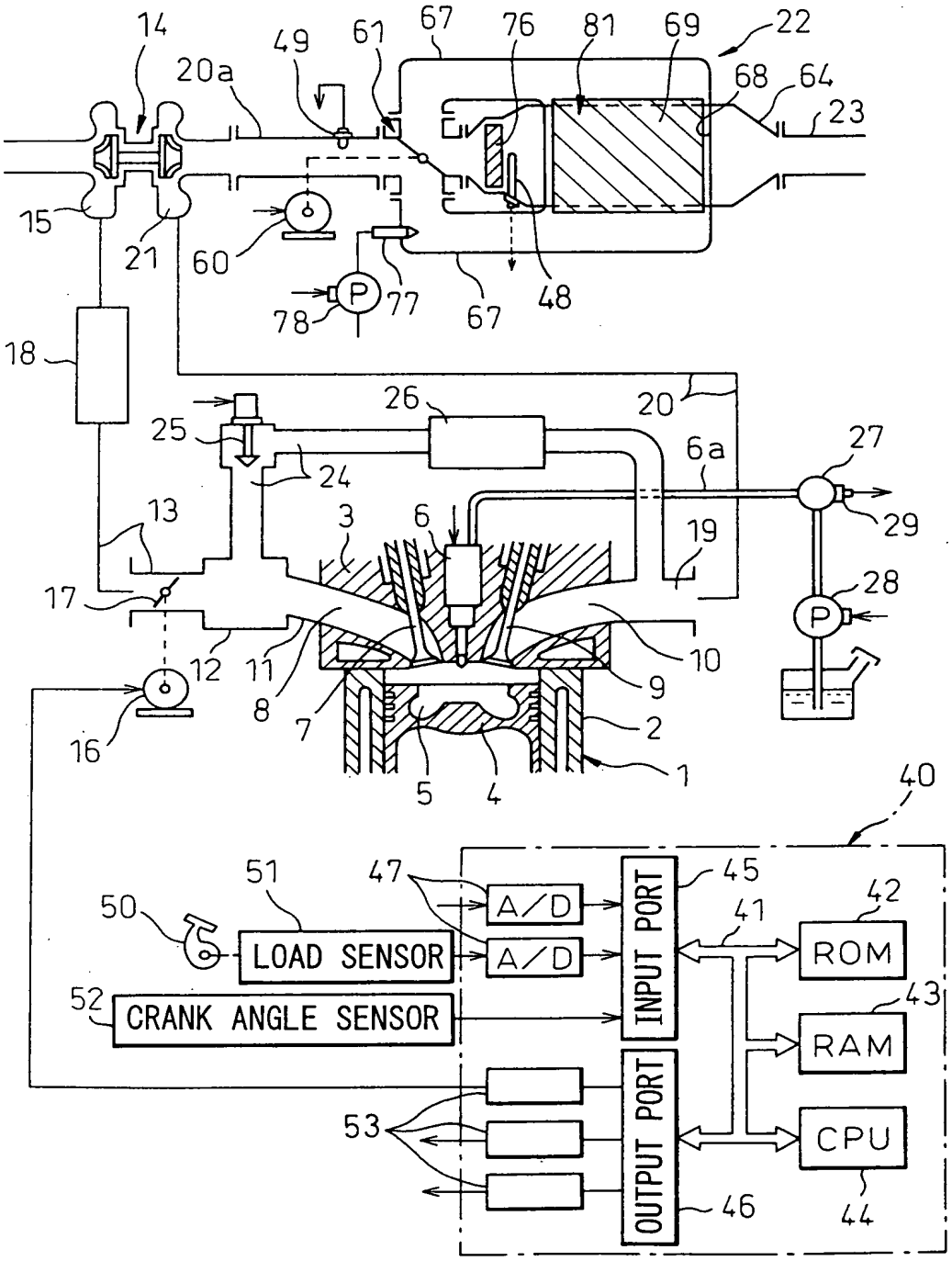
14
20a
49
61
67
76
81
69
22
68
64
23
15
21
60
78
77
67
48
18
26
20
25
24
6a
27
13
3
6
19
29
17
28
12
11
8
7
10
9
2
16
5
4
1
40
51
47
50
A/D
45
INPUT PORT
41
42
ROM
LOAD SENSOR
A/D
52
CRANK ANGLE SENSOR
43
RAM
53
OUTPUT PORT
CPU
46
44

Fig.2A

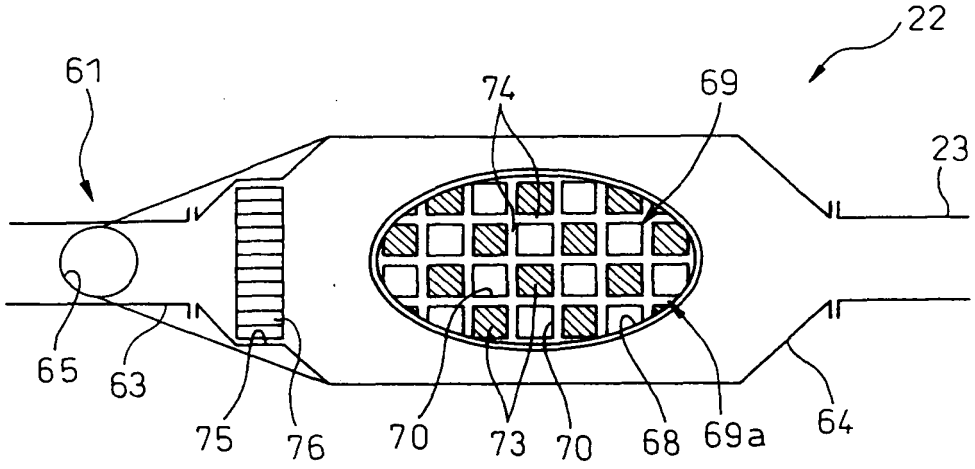
22
61
74
69
23
65
63
75
76
70
73
70
68
69a
64

Fig.2B

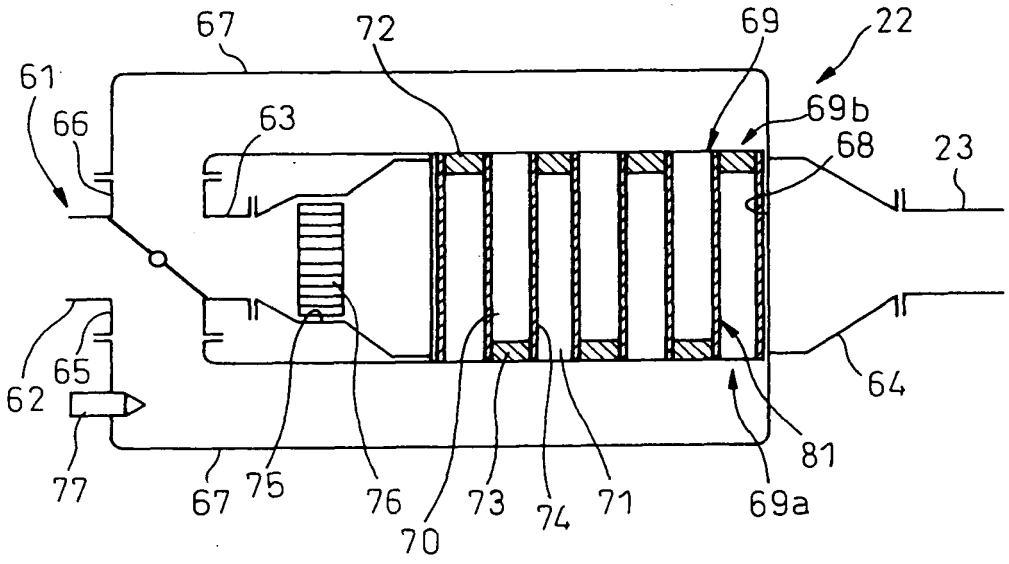
67
72
69
22
61
69b
66
63
68
23
62
65
64
77
67
75
76
73
74
71
81
69a
70

Fig.3A

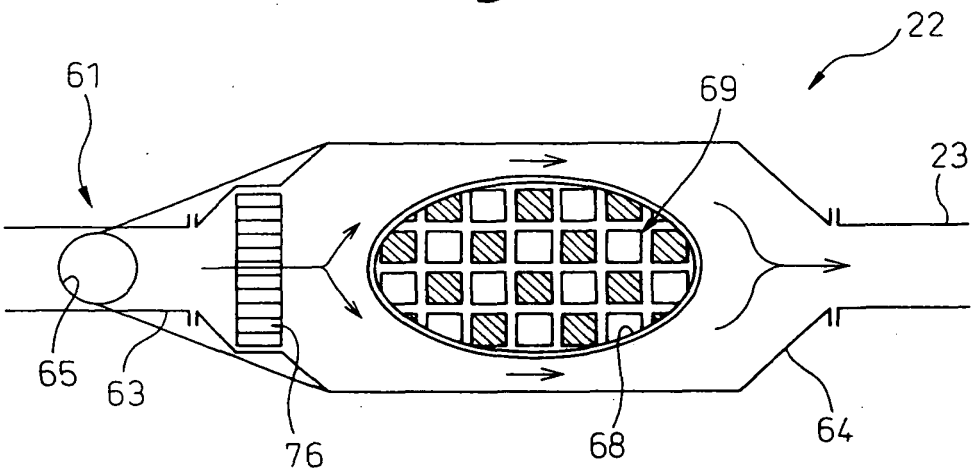
22
61
69
23
65
63
76
68
64

Fig.3B

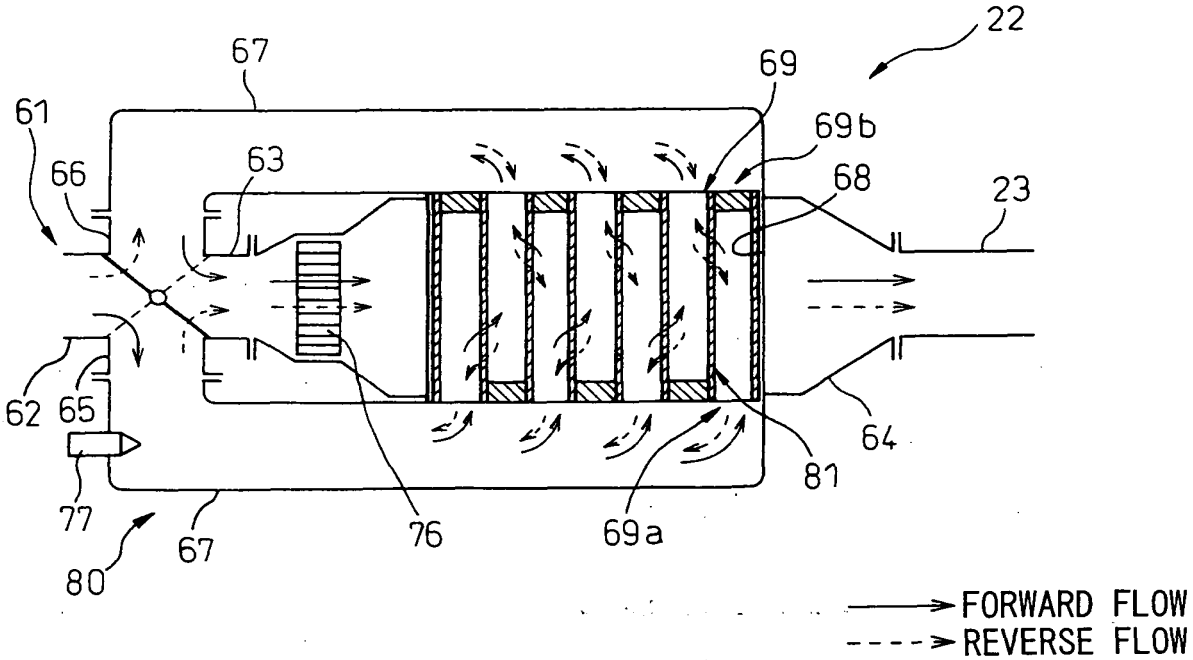
22
67
69
61
69b
66
63
68
23
62
65
64
81
77
76
69a
67
80
FORWARD FLOW
REVERSE FLOW

Fig.4

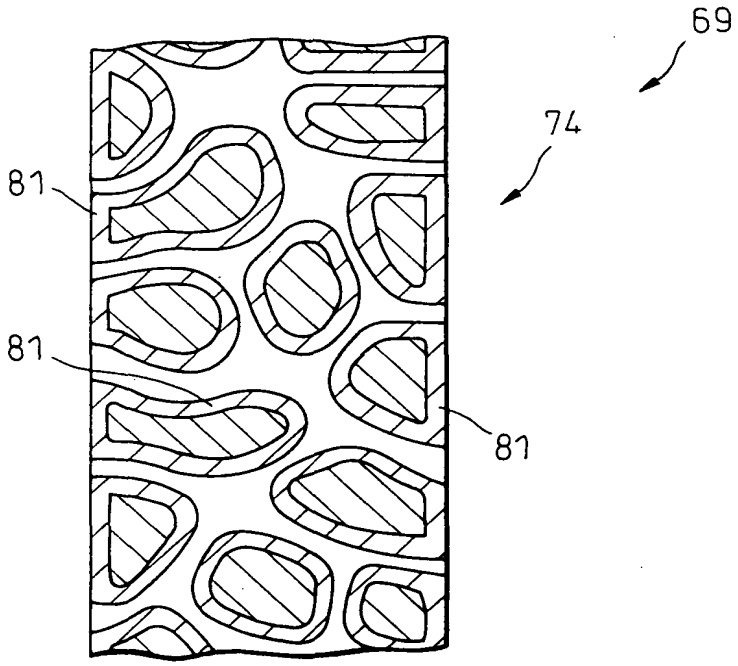

Fig.5

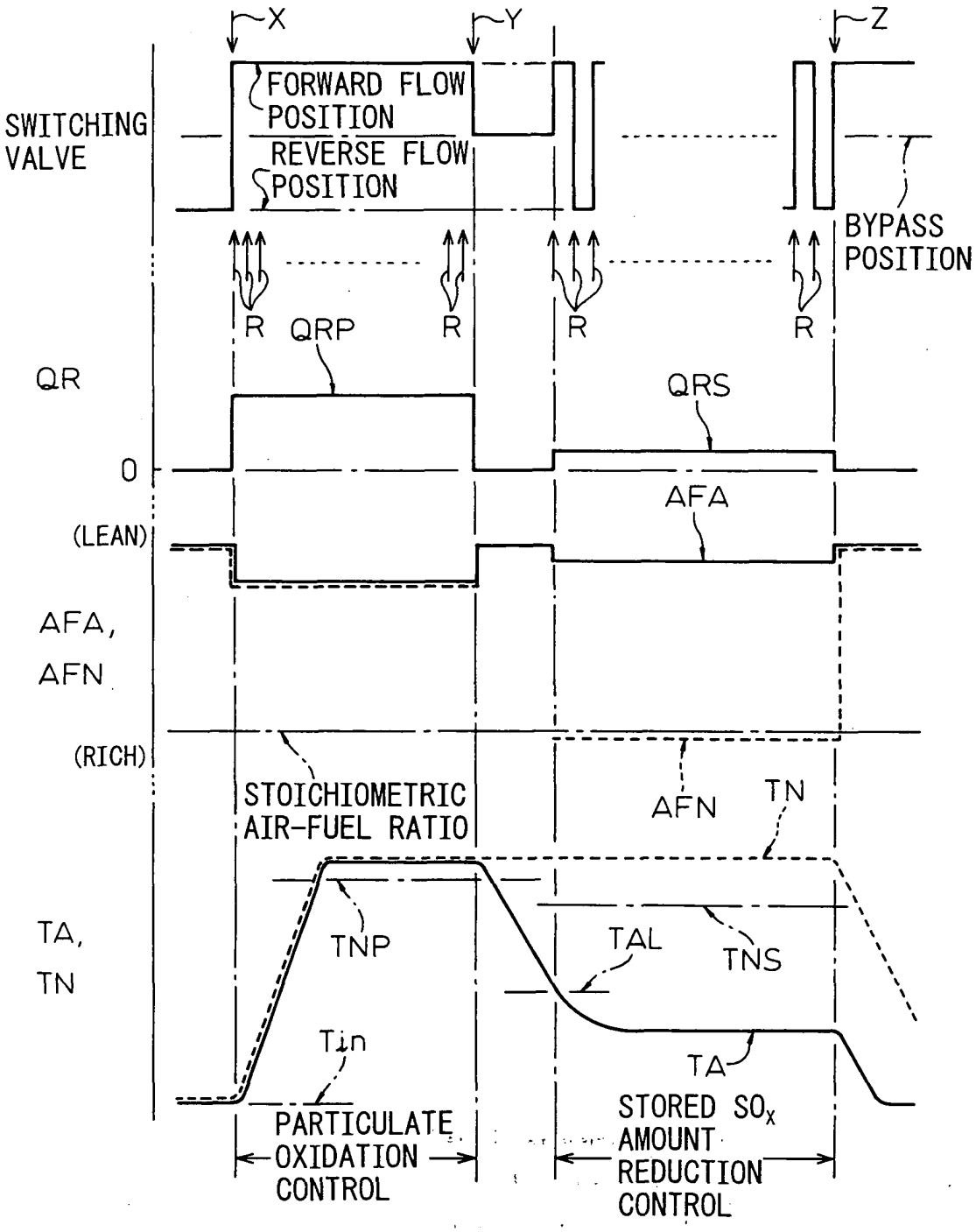
X
Y
Z
SWITCHING VALVE
FORWARD FLOW POSITION
REVERSE FLOW POSITION
BYPASS POSITION
R
QRP
QR
QRS
0
AFA
(LEAN)
AFA, AFN
(RICH)
STOICHIOMETRIC AIR-FUEL RATIO
AFN
TN
TA, TN
TNP
TAL
TNS
Tin
TA
PARTICULATE OXIDATION CONTROL
STORED SOx AMOUNT REDUCTION CONTROL

Fig.6

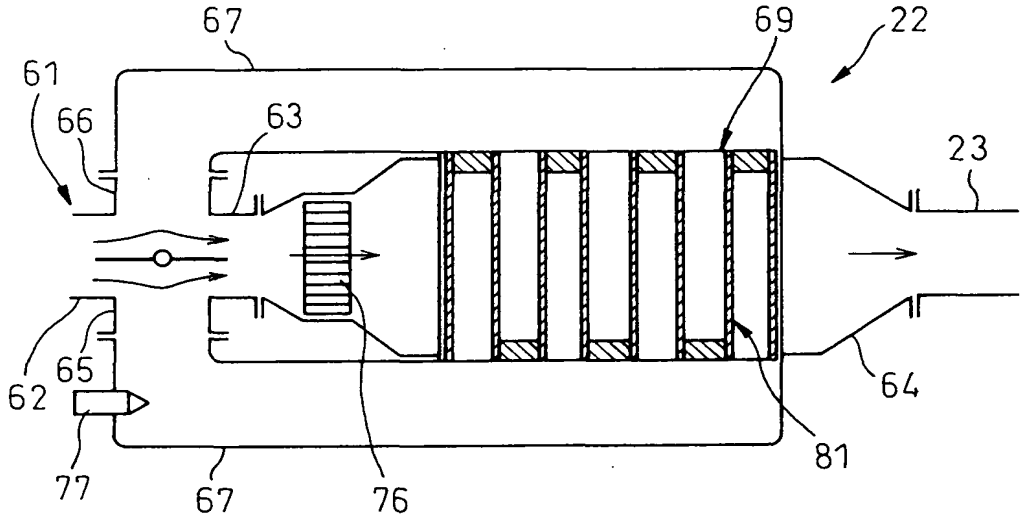

Fig.7A

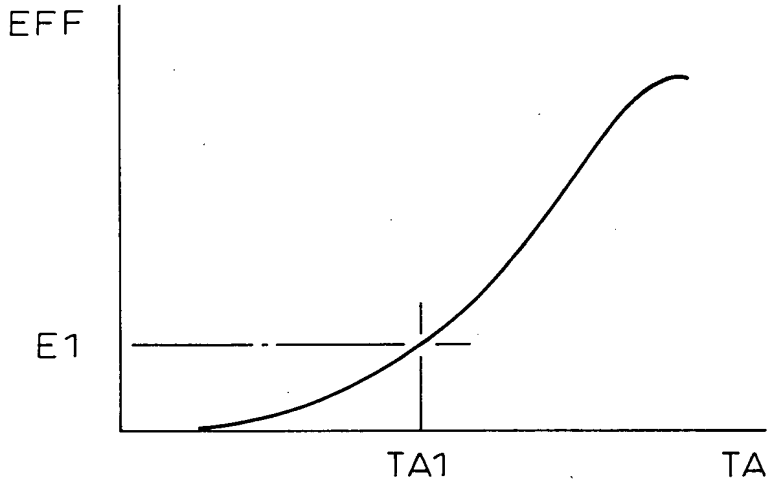

Fig.7B

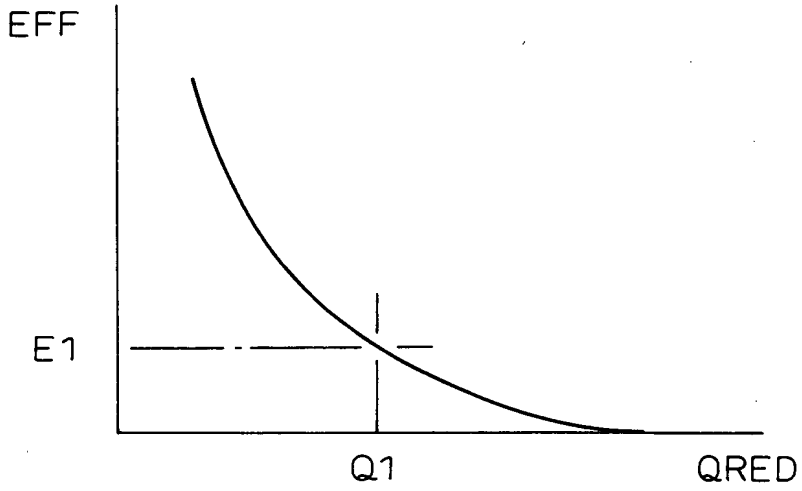

Fig.8

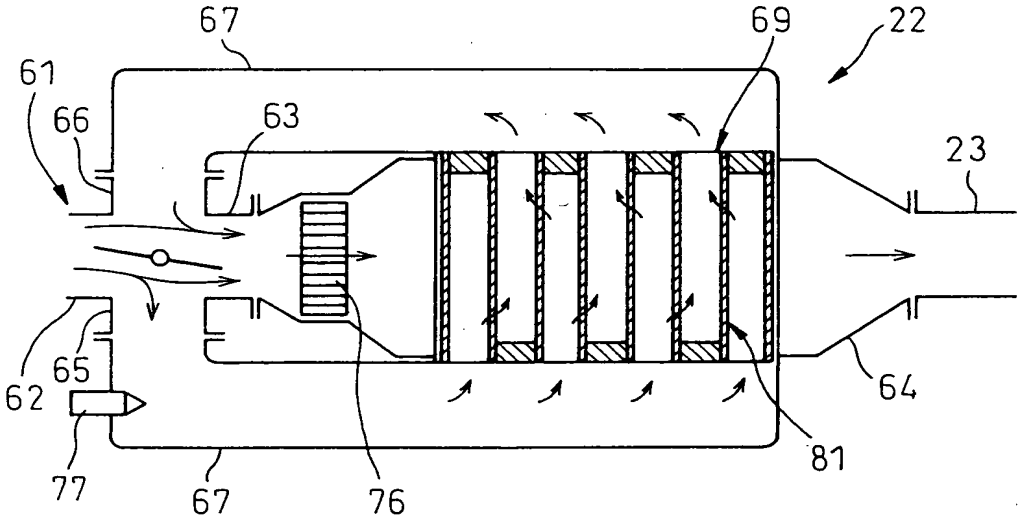
67
69
22
61
66
63
23
62
65
64
77
67
76
81

Fig.9

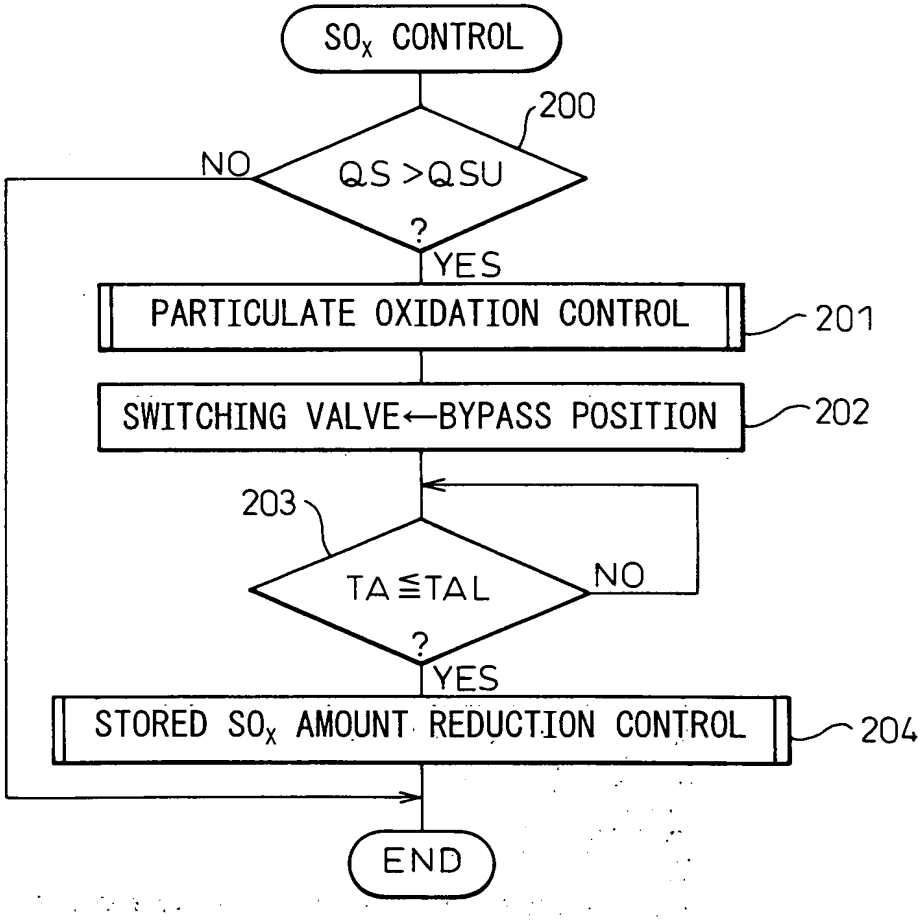
SOx CONTROL
200
NO
QS >QSU
?
YES
PARTICULATE OXIDATION CONTROL
201
SWITCHING VALVE←BYPASS POSITION
202
203
TA≦TAL
NO
?
YES
STORED SOx AMOUNT REDUCTION CONTROL
204
END

Fig.10

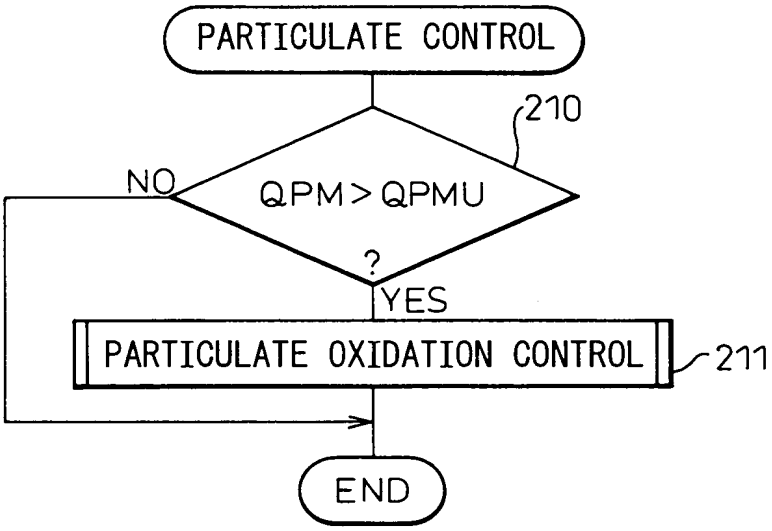
PARTICULATE CONTROL
210
NO
QPM>QPMU
?
YES
PARTICULATE OXIDATION CONTROL
211
END

Fig.11

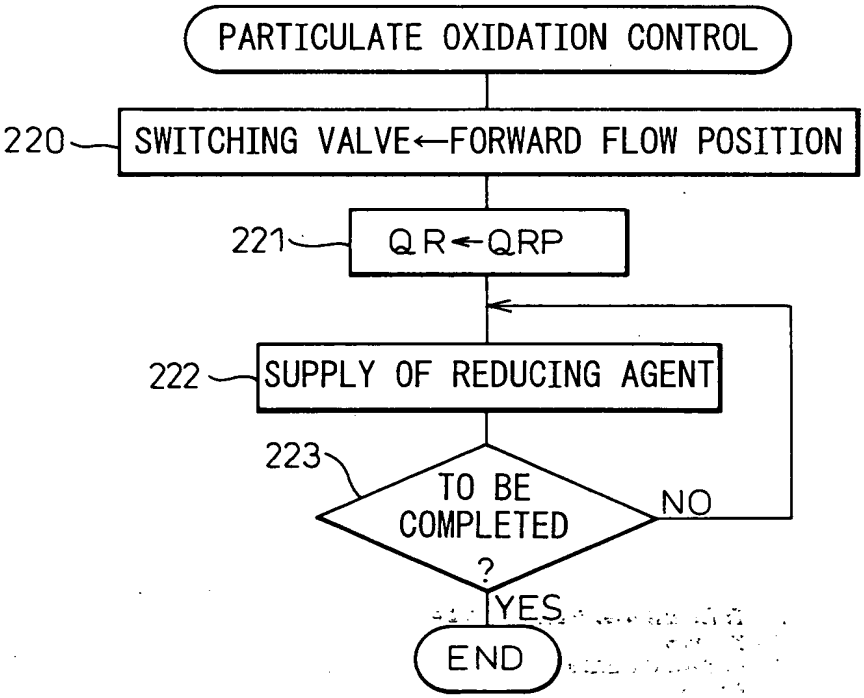
PARTICULATE OXIDATION CONTROL
220
SWITCHING VALVE←FORWARD FLOW POSITION
221
QR←QRP
222
SUPPLY OF REDUCING AGENT
223
TO BE COMPLETED
?
NO
YES
END

Fig.12

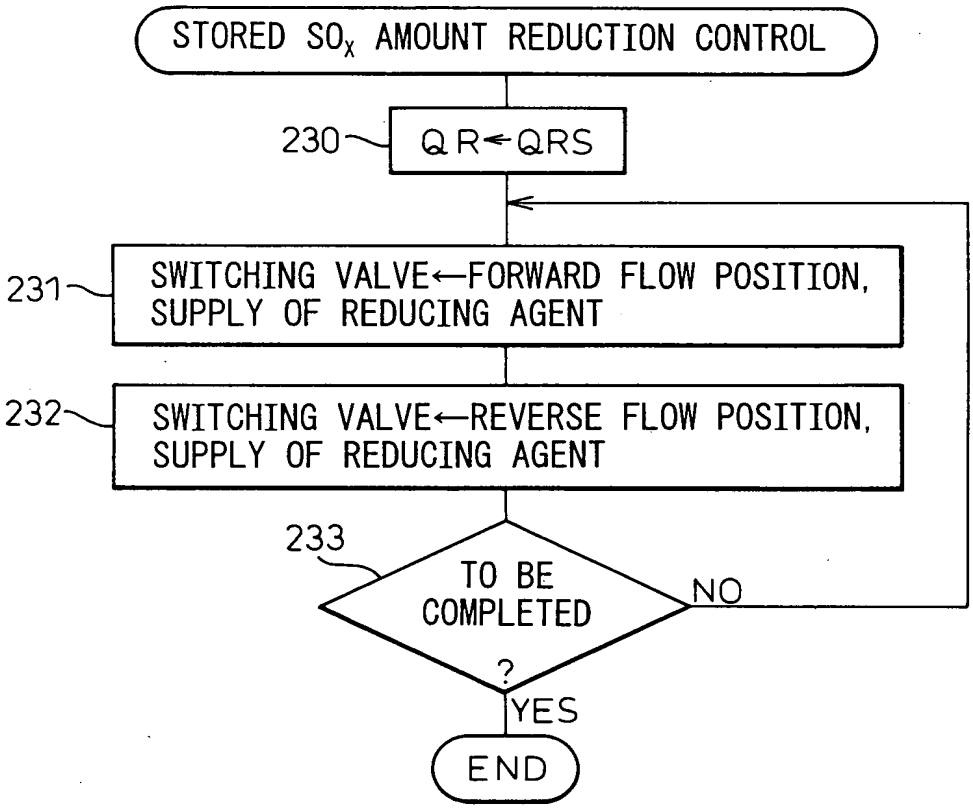
STORED SO_x AMOUNT REDUCTION CONTROL
230
QR←QRS
231
SWITCHING VALVE←FORWARD FLOW POSITION, SUPPLY OF REDUCING AGENT
232
SWITCHING VALVE←REVERSE FLOW POSITION, SUPPLY OF REDUCING AGENT
233
TO BE COMPLETED ?
NO
YES
END

Fig.13

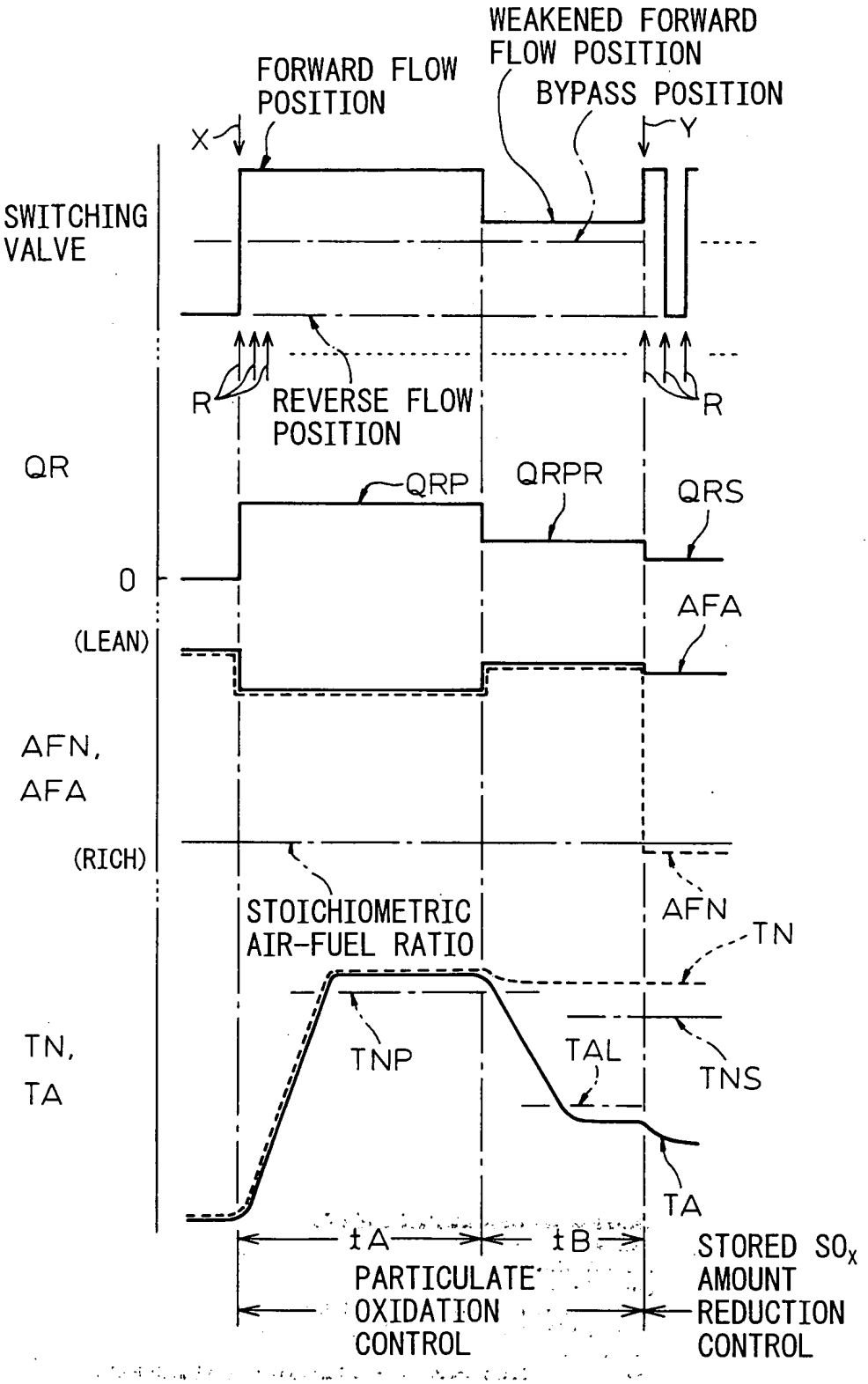
WEAKENED FORWARD FLOW POSITION
FORWARD FLOW POSITION
BYPASS POSITION
X
Y
SWITCHING VALVE
R
REVERSE FLOW POSITION
R
QR
QRP
QRPR
QRS
0
AFA
(LEAN)
AFN, AFA
(RICH)
STOICHIOMETRIC AIR-FUEL RATIO
AFN
TN
TN, TA
TNP
TAL
TNS
TA
tA
tB
PARTICULATE OXIDATION CONTROL
STORED SOx AMOUNT REDUCTION CONTROL

Fig.14

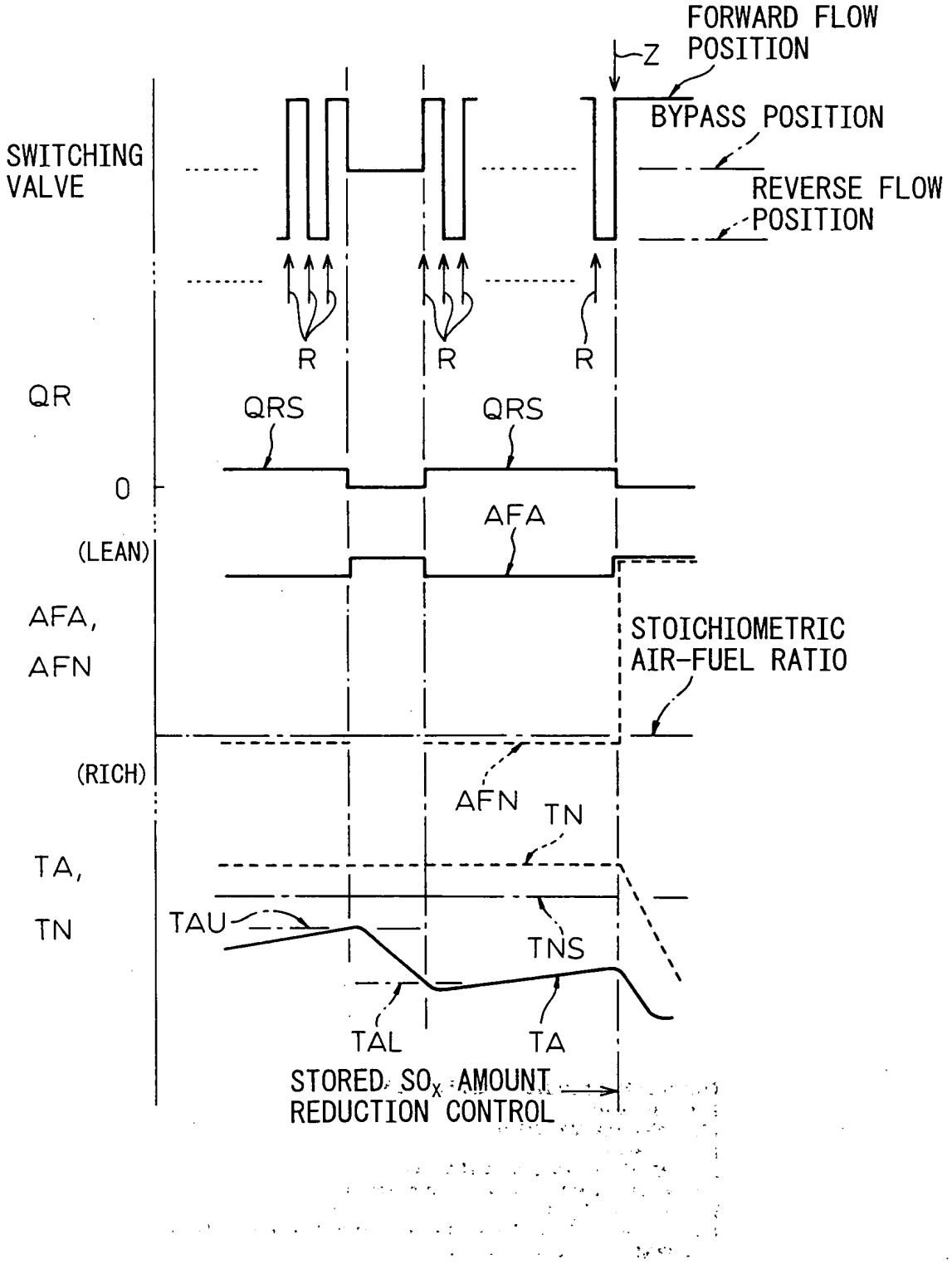
FORWARD FLOW POSITION
Z
BYPASS POSITION
REVERSE FLOW POSITION
SWITCHING VALVE
R
R
R
QR
QRS
QRS
0
AFA
(LEAN)
AFA,
AFN
STOICHIOMETRIC AIR-FUEL RATIO
(RICH)
AFN
TN
TA,
TN
TAU
TNS
TAL
TA
STORED SOx AMOUNT REDUCTION CONTROL

Fig.15

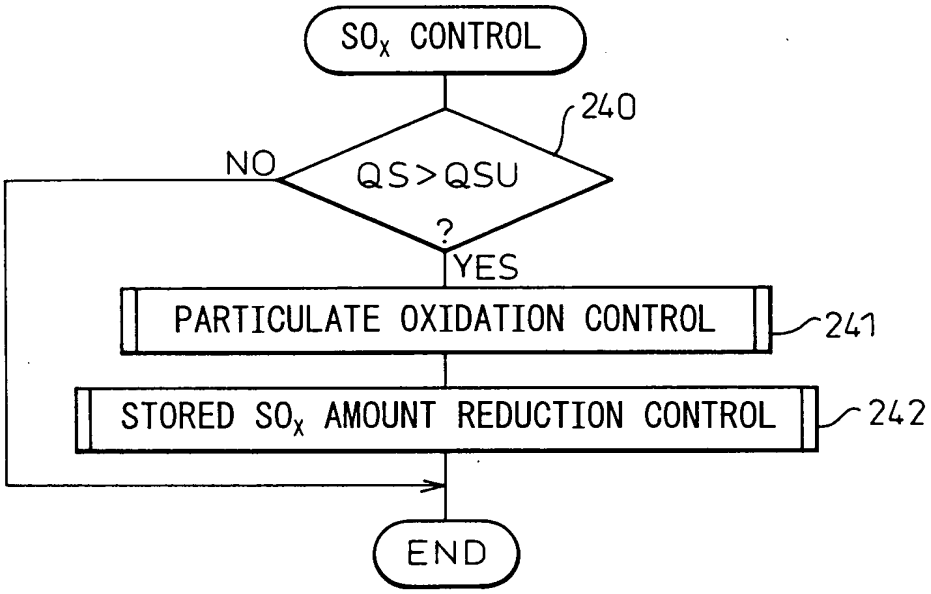
SOx CONTROL
240
NO
QS>QSU
?
YES
PARTICULATE OXIDATION CONTROL
241
STORED SOx AMOUNT REDUCTION CONTROL
242
END

Fig.16

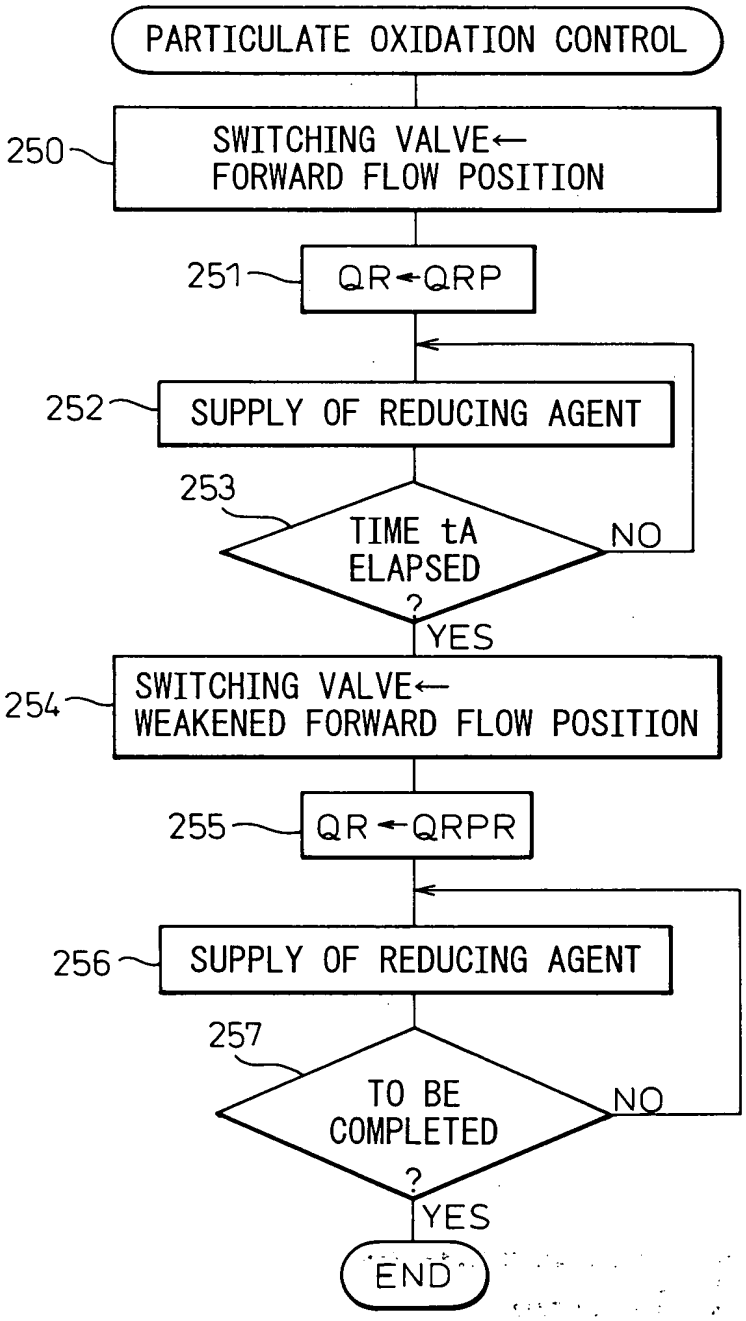
PARTICULATE OXIDATION CONTROL
250
SWITCHING VALVE← FORWARD FLOW POSITION
251
QR←QRP
252
SUPPLY OF REDUCING AGENT
253
TIME tA ELAPSED ?
NO
YES
254
SWITCHING VALVE← WEAKENED FORWARD FLOW POSITION
255
QR←QRPR
256
SUPPLY OF REDUCING AGENT
257
TO BE COMPLETED ?
NO
YES
END

Fig.17

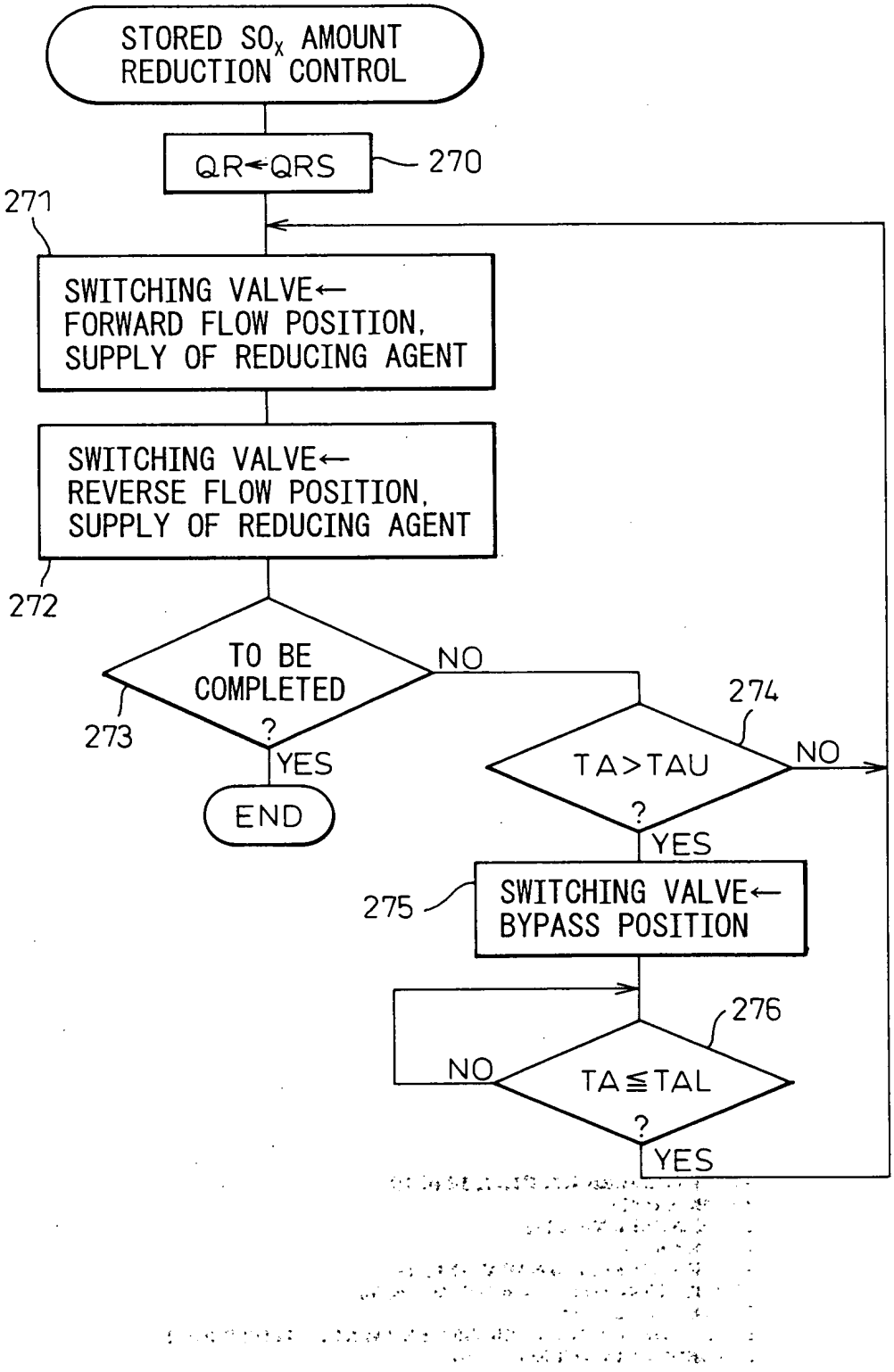
STORED SO_x AMOUNT REDUCTION CONTROL
QR←QRS
270
271
SWITCHING VALVE← FORWARD FLOW POSITION, SUPPLY OF REDUCING AGENT
SWITCHING VALVE← REVERSE FLOW POSITION, SUPPLY OF REDUCING AGENT
272
TO BE COMPLETED ?
NO
YES
273
END
274
TA>TAU ?
NO
YES
275
SWITCHING VALVE← BYPASS POSITION
276
TA≦TAL ?
NO
YES

Fig.18

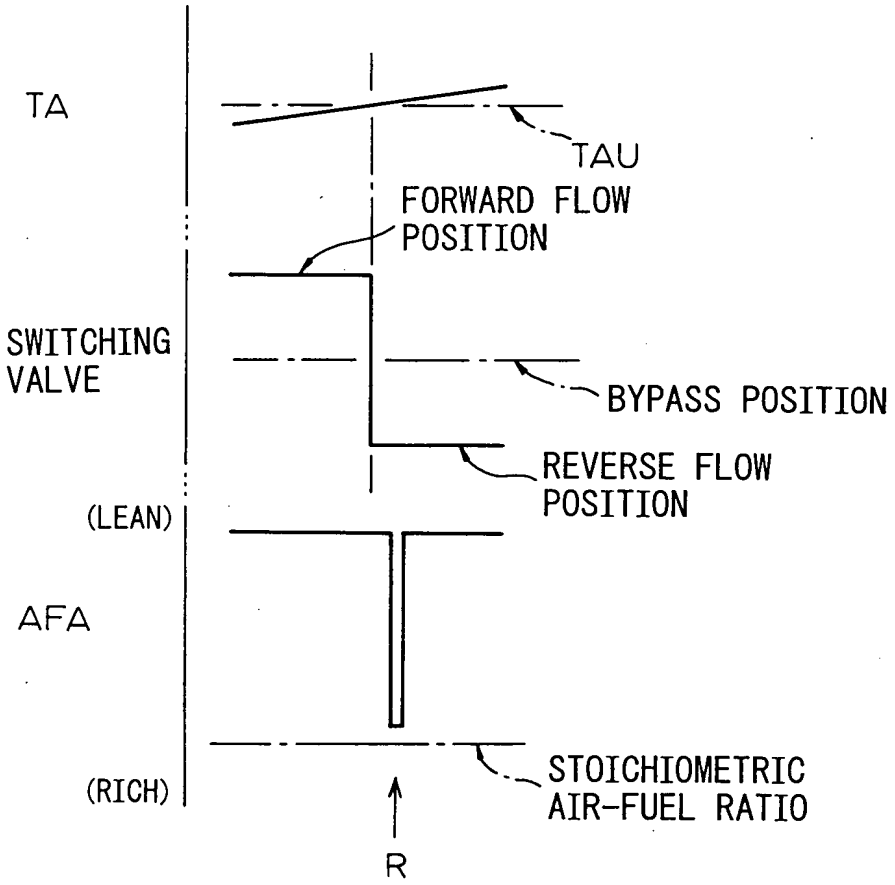
TA
TAU
FORWARD FLOW POSITION
SWITCHING VALVE
BYPASS POSITION
REVERSE FLOW POSITION
(LEAN)
AFA
STOICHIOMETRIC AIR-FUEL RATIO
(RICH)
R

Fig.19

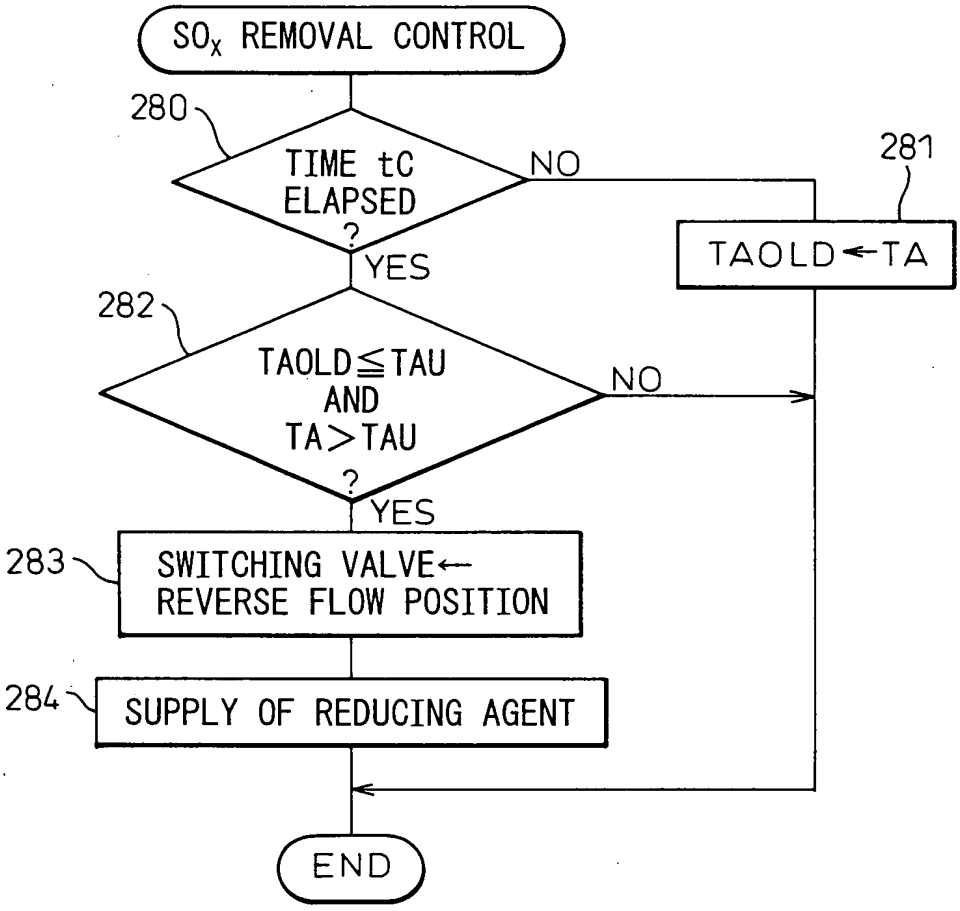
SOx REMOVAL CONTROL
280
TIME tC ELAPSED ?
NO
281
TAOLD←TA
YES
282
TAOLD≦TAU AND TA>TAU ?
NO
YES
283
SWITCHING VALVE← REVERSE FLOW POSITION
284
SUPPLY OF REDUCING AGENT
END

Fig.20

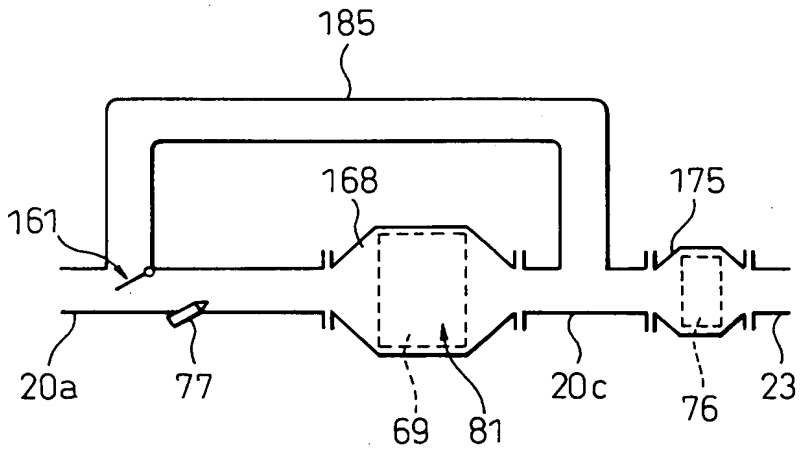

Fig.21

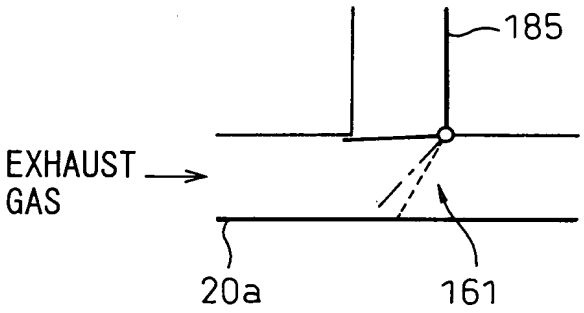

Fig.22

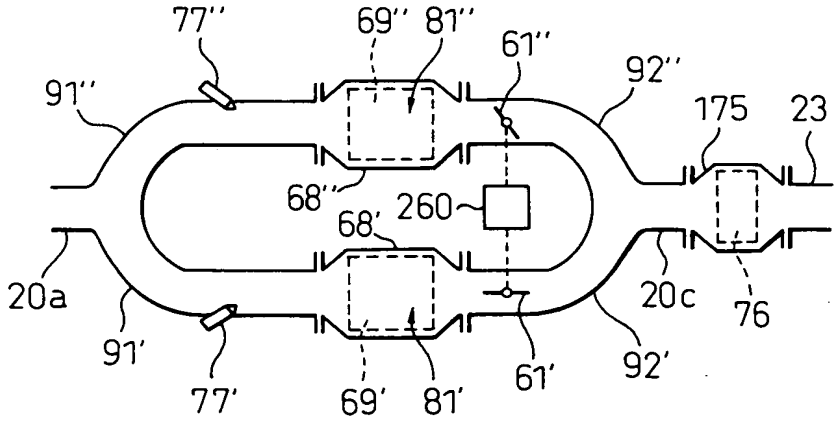

Fig.23A

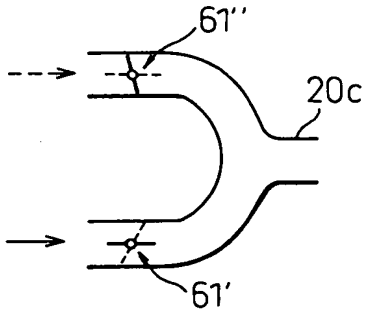
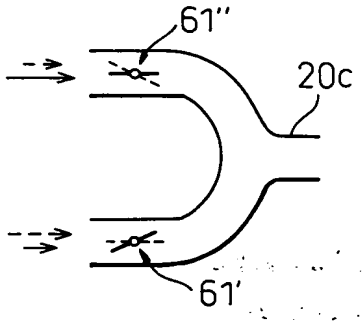
Fig.23B